

Title: Waves in Space Plasmas: WISP

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Short Description: WISP utilizes powerful radio transmitters and sensitive receivers to probe the secrets of the magnetosphere, ionosphere and atmosphere. The scientific objective is to achieve a better understanding of the physical processes occurring in these regions. For example, audio frequency radio waves will be radiated from the long WISP antenna, will travel to the outer reaches of the magnetosphere, and will interact with Van Allen belt particles, releasing some of their energy which amplifies the waves. Study of this interaction will give us a better understanding of a major magnetospheric process, wave-particle interactions. Radio waves from WISP at higher frequencies (AM radio and beyond) will be reflected by the ionosphere and will, for example, advance our understanding of bubbles in the equatorial ionosphere which affect satellite communications.

Instrument Characteristics:

Mass: 1200 kg
Volume: 6 cubic meters
Power: 6 kW initially (evolving to 50+ kW)
Data rate: 10 Mbs

General Comments:

Heritage is from Spacelab instrument to fly in 1990 and 1992 on SPL 1 and 2.

No scanning is required.

The antenna will be extendable and retractable, but once extended, does not have to be retracted until the end of the WISP mission.

It is expected that a fixed location for the antenna will be adequate for the science on STO.

Antenna mounting must be such that its axis is in the velocity vector or the zenith/nadir vector.

Antenna length may be up to 1000 meters (desired) tip-to-tip; (300 meters tip-to-tip initially).

WISP must also be able to connect to the conducting tether wire for an antenna.

Source of Information: WISP development for SPL.

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